OIPE IAP15
NOV 01 2005
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Allan D. Jepson et al.

Assignee: Xerox Corporation

Title: ROBUST, ON-LINE, VIEW-BASED APPEARANCE MODELS FOR VISUAL MOTION ANALYSIS AND VISUAL TRACKING

Serial No. 10/016,659 File Date: December 7, 2001

Examiner: Tom Y. Lu Group Art Unit: 2621

Docket No.: A1459 (XC-012) US

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF DAVID FLEET UNDER 37 CFR 1.132

I, the undersigned named inventor, declare as follows.

1. This declaration accompanies a Response to Second Office Action, which is responsive to the Office Action Mailed on 07/01/05.

2. As set forth in my Curriculum Vitae, which is appended to this Declaration, I have been involved (academically and/or professionally) with the field of image processing since the early 1980s, and currently teach computer vision courses at the University of Toronto, where I hold the position of Professor in the Department of Computer Science. As such, I am qualified to comment on the state of knowledge of one skilled in the art of computer vision at the time the present invention was filed.

BEST AVAILABLE COPY

3. It is common to any one working in this field that citations to textbooks and previously published papers are a common, often necessary way to specify novel inventions, i.e., inventions building on prior art. With respect to the specific references cited by the Examiner (listed below), the material represented in these references is not essential material in that, in each instance cited by the Examiner, the referenced subject matter was well known to those skilled in the art at the time of the invention, specifically:

a) Page 22, "Steerable Filters": steerable filters and pyramids were commonplace at the time of the invention in the image processing and computer vision fields. For many people of Applicants' skill level it would have been unnecessary to consult the references given. For students this material would have been covered in most gradate courses on computer vision.

b) Page 22, "Stability of Phase Information": the citation to the use of phase information does not deal with an issue critical to the details of the invention, except to support that this particular implementation is one of the best modes (i.e., produces accurate estimates of image motion). However other methods existed at the time of the invention that would likely have produced estimates of similar quality.

c) Page 23, Region-Based Tracking": any graduate student in the field of computer vision at the time of the invention would have been comfortable with parameterized warp functions and optimization for parameter estimation. Again this reference would be unnecessary for many people skilled in the art, and is there mainly for the uninitiated.

d) Page 24, "Mixture Models": the EM algorithm is critical to the implementation in this invention. That said, this was commonplace at the time of the invention in computer science courses at the graduate level in computer vision, machine

BEST AVAILABLE COPY

learning, text analysis, data mining, parameter estimation, stochastic processes, etc. This is a common mathematical tool, known to people skilled in the art. It is taught and/or used in at least 10 graduate courses in computer science at the University of Toronto. Most introductory books on statistical pattern recognition and machine learning, as well as modern textbooks on computer vision explain the EM algorithm.

e) Page 28 "Stability of Phase Information": the method to detect instabilities is useful, and specific to this particular instantiation (or mode) of the invention. The method for detecting phase instabilities is extremely straightforward in the cited paper, and many other people implemented it and used it soon after disclosure of the invention.

f) Page 28, "Mixture Models": the use of coarse-to-fine optimization was common in motion estimation at the time of the invention. Coarse-to-fine techniques are taught in almost any graduate course on computer vision, and date back to the 1980s. They are commonplace.

g) Page 29: "Phase-Based Disparity Measurement": the relationship between the phase gradient and the filter response gradient is based on a well-known trigonometric identity taught in high school. The use of the identity for computing phase gradients is straightforward and mechanical, and therefore often relegated to an appendix in papers. It was straightforward to anyone skilled in the art at the time of the invention.

4. I declare that all statements made herein of my own respective knowledge are true, all statements made herein on information and belief are believed to be true, and all statements made herein are made with the knowledge that whoever, in any matter within the jurisdiction of the Patent and Trademark Office, knowingly and willfully falsifies, conceals,

BEST AVAILABLE COPY

or covers up by any trick, scheme, or device a material fact, or makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be subject to the penalties including fine or imprisonment or both as set forth under 18 U.S.C. 1001, and that violations of this paragraph may jeopardize the validity of the application or this document, or the validity or enforceability of any patent resulting therefrom.

Date: Oct 27/05

D Fleet

David J. Fleet

BEST AVAILABLE COPY